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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,105	10/21/2003	Won Song	SAM-0224-DIV	3737
7590		07/14/2004	EXAMINER	
Mills & Onello LLP		HU, SHOUXIANG		
Suite 605				
Eleven Beacon Street		ART UNIT		
Boston, MA 02108		2811		
		PAPER NUMBER		

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/690,105

Applicant(s)

SONG ET AL.

Examiner

Shouxiang Hu

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/906,306.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>03-24-2004</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claims 1-7 are objected to because of the following informalities and/or defects:

Claims 1-7 fail to clarify the following subject matters:

(A) What are the relationship among the recited "unit marks", "patters" and "close pattern".

(B) How many patterns are formed in each of the mesa- or trench-type unit marks;

(C) A mesa pattern can only be formed in a trench-type unit mark; or a trench pattern can only be formed in a mesa-type unit mark.

(D) Is P' the pitch of the sub-mesas or sub-trenches in each of the patterns or the pitch of the recited patterns each containing multiple sub-mesas or sub-trenches?

(E) Is n' is a number of the mesa or trench patterns or a number of the sub-trenches or sub-mesas in each of the mesa or trench patterns?

(F) Is t the width of the sub-mesa or sub-trench in each of the patterns or the entire width of each of the mesa or trench patterns?

In claim 4, the term of " $2n'+1$ " appears to be in error.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, as being best understood in view of the claim objections above, are rejected under 35 U.S.C. 102(b) as being anticipated by Mizutani (5,601,957).

Mizutani discloses an alignment mark (particularly, see Figs. 2a and 2b; also see col.14, lines 18-28), trench-type unit marks (74A-74E) in an underlying layer (72, 73 and 79), and a pattern of sub-mesas (78) in each of the unit marks, wherein the an alignment signal is naturally formed during an alignment process thereon; and dishing is naturally prevented in a chemical mechanic polishing process thereon.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-7, as being best understood in view of the claim objections above, are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani in view of Shiraishi (6,285,455).

The disclosure of Mizutani is discussed as applied to claims 1-3 above.

Although Mizutani does not expressly disclose that the alignment marks can be adapted to two probing beams, one of ordinary skill in the art would readily recognize that the alignment accuracy can be improved with the addition of a second probing beam, as evidenced in Shiraishi (particularly, see col. 12, lines 15 and 29). Furthermore, it is noted that, the refraction order, the pitch and width of the unit marks, and the pitch and width of the sub-marks within each of the unit marks are all art-recognized parameters of importance subject to routine experimentation and optimization. And, the recited refraction order, and the recited sizes for the pitch and/or width of the unit marks, the pitch and/or width of the sub-marks are respectively well within the art-known common values and/or ranges for them.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to make the alignment mark of Mizutani with the marks and sub-marks being adapted to two probing beams with the appropriate dimensions, per the teachings of Shiraishi, so that an alignment mark with better alignment precision would be achieved.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reference B is cited as being related to an alignment mark structure.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SH
July 7, 2004



SHOUXIANG HU
PRIMARY EXAMINER